

SOME PYCNOGONIDA FROM THE WESTERN CARIBBEAN WITH DESCRIPTIONS OF THREE NEW SPECIES

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ABSTRACT

A small shallow-water collection of 16 pycnogonid species in six genera from the western Caribbean coast of Middle America is presented and discussed. Three new species, representing predominantly shallow-water genera, are described, illustrated, and compared with their congeners from this relatively well collected area. The new species are *Ammothella panamensis*, *Anoplodactylus ampullaceus* and *Anoplodactylus dissitus*. Distributions are given for the other 13 species along with applicable remarks, and a new key is given to the genus *Ammothella*.

This small predominantly shallow water collection of only 52 specimens contains 16 species in six genera, and comes from areas relatively well collected in the shallows of the western Caribbean. Five of these 52 specimens are juveniles or larvae and cannot be identified beyond their genus. In spite of the small number of specimens, three species are described and illustrated as new: *Ammothella panamensis*, *Anoplodactylus ampullaceus* and *Anoplodactylus dissitus*. These three species suggest that sampling in areas only one or a few kilometers away from well collected localities (Stock, 1955, 1975; Child, 1979), or in slightly varied depths of a few meters, can produce very different fauna. Distribution is given for all species and associated remarks are included. Each new species is described, distribution is given, its details are illustrated, and it is compared with its congeners. An artificial key to the genus *Ammothella* is provided to differentiate between species which appear increasingly closely related and difficult to separate as additional new species are described.

MATERIAL

The specimens were collected by scientists aboard the American Vessel RV ALPHA HELIX using dredges and trawls, and by shore collecting. The vessel was making a preliminary cruise in the western Caribbean in 1977, before making another longer cruise for more extensive and wide ranging marine collections in the Indo-West Pacific in 1979. The 1979 pycnogonids were reported on by Stock (1994).

SYSTEMATICS

Family AMMOTHEIDAE Dohrn, 1881

Genus *Achelia* Verrill, 1900

Achelia sawayai Marcus, 1940

Achelia sawayai Marcus, 1940: 81–86, figs. 10a–f, 17a–k.—Fry & Hedgpeth, 1969: 104 (early literature), figs. 152, 153, 155, tabs. 13, 14.—Müller, 1990a: 106; 1990b: 278; 1992a: 118–119; 1992b: 43.—Child, 1992: 11–12 [literature], fig. 3.—Stock, 1994: 36.

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. 22–2000, June 29, 1977. (1 ♂, 1 ♀)

Distribution.—This well known shallow-water/littoral species is common mostly in Caribbean regions and appears in almost every group of pycnogonids reported from there. It has also been found in West Africa, Madagascar, Indonesia, Papua New Guinea, Fiji and the Society Islands, giving it a probable pantropical range if all records listed for this extremely variable species are correct.

Remarks.—This species belongs to one of the most problematical genera of the Pycnogonida. It is one with species having more intraspecific variation than those in almost any other group, making determination of identities more difficult than with most other genera. It is increasingly difficult to discern where wide variation in characters ends and true speciation begins.

This species usually has fewer tubercles than many others. The trunk, lateral processes and distal legs bear none while the first coxae usually only have three tall setose tubercles rather than the usual one or two tubercle pairs of other species.

Genus *Ammothella* Verrill, 1900

Ammothella exornata Stock, 1975

Ammothella exornata Stock, 1975: 974–978, figs. 7c–d, 8; 1979: 9, fig. 1b–c.—Child, 1979: 9, fig. 3a–c.—Müller, 1990: 278.

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. 22–2000, June 29, 1977. (9 specimens)

Distribution.—All known records for this species confine it to Florida and the Caribbean, from Panama to both the Greater and Lesser Antilles, and to southern Florida, in shallow-water habitats.

Remarks.—There are many tall, 'fancy' angulate tubercles with bumps and spikes on this rotund species. These include at least two dorsally on the trunk, particularly in juveniles where they are even more ornate. These angulate tubercles allow it to be identified fairly easily from most other tuberculate species of *Ammothella*, particularly in the Caribbean where tuberculate species are few and far between. The appearance of ornate protrusions on each tubercle are subject to great variation.

Ammothella panamensis new species

(Fig. 1)

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. MS-21–500, June 29, 1977 (1 ♂ holotype, USNM 234731). Panama, Golfo de San Blas, Cayos Holandes, 09°34'36"N, 78°43'12"W, intertidal, sta. MS-23-500, June 30, 1977 (1 ♀ paratype, USNM 234732).

Other Material.—Panama, Golfo de San Blas, Punta de San Blas, 09°32'48"N, 78°59'40"W, sta. ND-26-500, June 30, 1977 (1 juv.). Panama, Bahía Limón, 09°20'N, 79°55'W, plankton net, sta. BN-28-50, July 6, 1977 (1 ♂ with eggs, 1 juv.). Panama, Laguna de Chiriquí, off Cayo Agua, 09°12'48"N, 82°02'06"W, dredge in 4 m, sta. ND-31-500, July 8, 1977 (1 juv.)

Distribution.—The new species is known only from the Caribbean coast of Panama in littoral and sublittoral depths.

Description.—Species tiny; leg span 7.5 mm. Trunk fully segmented, without adornment. Lateral processes separated by about their diameters, about 1.5 times as long as their adjacent trunk segment diameters, each with single tubular dorsodistal spine almost as long as its lateral process diameter. Ocular tubercle long, twice longer than cephalic segment diameter, tip rounded, filled with large well pigmented eyes. Proboscis typical, long, with proximal and distal constrictions around well inflated middle section. Abdomen long, curved from almost vertical to horizontal, armed proximally with pair of long dorsolateral tubular spines, pair of shorter ventral spines, distally with matching pair of long tubular spines, more distally with pair of longer dorsodistal setae, and pair of short lateral setae at tip.

Chelifores almost as long as proboscis, second segment 1.6 times length of first, both distally clubbed. First segment armed distally with tubular dorsal spine and lateral seta or another tubular spine (varies). Second segment with tubular spines: short dorsolateral pair; similar long dorsal pair; one or two similar lateral and distal spines, and three or four long pointed spines on distal rim. Chelae atrophied, not functional, with single lateral seta.

Palps typical, 9-segmented, second and fourth segments longest, subequal. Seventh segment longer than sixth, distal three segments almost equal in length, all five distal segments armed with scattered ventral setae little longer than segment diameters.

Ovigers slender, second segment longest, strigilis seventh segment with four ectal setae, eighth through tenth each with single ectal seta, and endal denticulate spines in formula 2:1:1:2. Most distal spines on each strigilis segment with 5–6 lateral teeth.

Legs slender, long, with few long tubular spines and as many longer pointed spines, few ventral short spines. First pair of first coxae with one dorsal tubular spine and two anterior/posterior pointed spines, posterior three coxae pairs with two similar tubular spines and two pointed spines. Second coxae with similar pairs of tubular and pointed spines. First tibiae the longest segments, slightly curved, femora slightly shorter. Dorsodistal cement gland tube robust, very long, almost twice longer than femur diameter. Tarsus very short, semitriangular, without major heel spine. Propodus moderately short, slightly curved, with three heel spines of varying size and 7–8 sole spines. Main claw less than half propodal length, auxiliary claws slightly longer than main claw.

Measurements (in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 0.76; trunk width (across second lateral processes), 0.73; proboscis length, 0.59; abdomen length, 0.48; third leg, coxa 1, 0.19; coxa 2, 0.34; coxa 3, 0.28; femur, 0.68; tibia 1, 0.71; tibia 2, 0.66; tarsus, 0.07; propodus, 0.31; claw, 0.14, auxiliary claw, 0.15.

Etymology.—The proposed species name refers to country of origin for the type specimens.

Remarks.—This species is very like *A. appendiculata* (Dohrn, 1881) except for the conspicuous lateral process tubes of the new species which are not shared by *A. appendiculata*. It shares similarities with at least four others: *Ammothella longiocularata* (Farraggiana, 1940); *A. pacifica* (Hilton, 1942); *A. proluxa* Child, 1990; and *A. alcalai* Child, 1988. This species generally has more similarities to *A. proluxa*, *A. pacifica* and *A. alcalai* in its slender habitus, mixed long tubular and pointed spines, ocular tubercle lengths, and slender legs. But *A. pacifica* has only a single short feathered spine on its anterior two pairs of lateral processes and none on the posterior two pairs while *A. proluxa* has tiny low

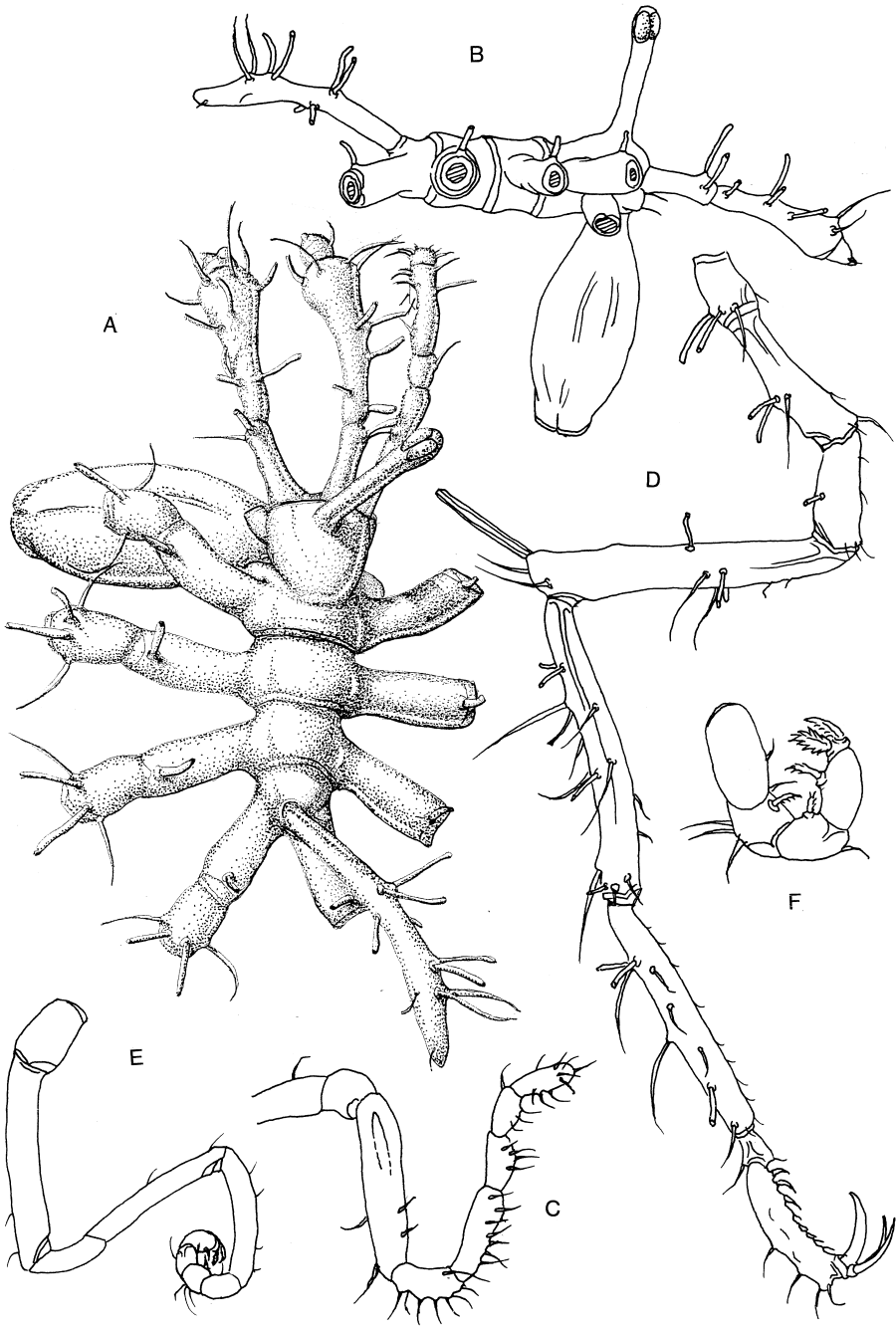


Figure 1. *Ammothella panamensis*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, palp; D, third leg; E, oviger; F, oviger strigilis, enlarged.

bumps for tubercles, no spines on its lateral processes and it is even more slender in most proportions than *A. panamensis*. The lateral processes of *A. alcalai* bear a single short inarticulate tubercle, broader than a spine, or in some cases two tubercles which are much shorter than the long apparently articulate tubular spine of *A. panamensis*. Each tube spine base is circumscribed with an apparent suture line which may or may not be an artifact. The habitus of *A. longioculata* is more robust and compact with its lateral processes more crowded but it has a short dorsodistal tubercle and from 3–6 short, laterodistal spines each with lateral setules (feathered) on the lateral process.

Ammothella species indeterminate

Material.— Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. 22-2000, June 29, 1977 (1 juv.). Panama, Laguna de Chiriquí, off Cayo Agua, 09°12'48"N, 82°02'06"W, dredge in 1–2 m, sta. ND-30-500, July 8, 1977 (1 larva).

Remark.—These two specimens are much too young to identify.

KEY TO ADULT *AMMOTHELLA* SPECIES (After Stock, 1954)

The number of *Ammothella* species described in the literature has more than doubled from 17–39 in little more than 30 yrs, including the new species described herein. An artificial key is presented to assist in sorting various newer species and look-alikes from older and better known forms.

- 1) Auxiliary claws fully formed 2
 Auxiliary claws vestigial *A. uniunguiculata* (Dohrn)
- 2) Both main and auxiliary claws well developed 3
 Main claw vestigial to lacking *A. biunguiculata* (Dohrn)
- 3) Trunk with dorsomedian ornamentation of any kind 4
 Trunk without dorsomedian tubercles, spines, or setae 13
- 4) Trunk with unarticulated tubercles of any size 5
 Trunk with only spines and/or setae of any size 12
- 5) Two trunk tubercles on first and second segments or second and third segments 6
 Trunk tubercle on first, second and third segments 7
- 6) Low conical trunk tubercles on first, second segments; lateral processes with similar dorsodistal tubercles; proboscis of regular slender shape *A. spinifera* Cole
 Tall trunk tubercles on second and third segments; lateral processes with slender tubercles as long or longer than segment diameters; proboscis fat, bulbous. *A. thetidis* Clark
- 7) Other small tubercles on ocular posterior and abdomen 8
 Tubercles only at dorsomedian trunk segmentation lines 9
- 8) Trunk slender, gracile, ocular tubercle 5–6 times taller than median diameter; proboscis typical, a slender oval; first scape segment much shorter than second *A. setosa* Hilton
 Trunk rotund, lateral processes crowded; ocular tubercle 2–2.5 times taller than diameter; proboscis very broad, short; two scape segments subequal *A. exornata* Stock
- 9) Trunk tubercles tall; lateral processes with various tubercles, with or without lateral spines 10
 Trunk tubercles small pimples; lateral processes with paired conical tubercles
 *A. paradisiaca* Loman

- 10) Trunk tubercles blunt or tapering, not as long as ocular tubercle or abdomen; lateral processes and scape first segment with multiple tubercles 11
 Trunk tubercles, ocular tubercle, abdomen length subequal; lateral processes with 1 low tubercle, 1–2 lateral spines; distal tubercle on first scape segment *A. stauromata* Child
- 11) Posterior trunk tubercle slightly longer, pointing obliquely toward posterior; anterolateral margins of ocular segment with tall slender tubercles *A. menziesi* Hedgpeth
 Trunk tubercles conical, subequal in size, vertical; anterior margin of ocular segment with low conical tubercles and 2–3 short spines *A. tuberculata* Cole
- 12) Trunk with 2 short spines on 2nd segment; lateral processes with slender dorsodistal tubercle, 0–3 antero-/posterodistal spines on lateral processes; proboscis typical, without ventral bulges; palp 9-segmented *A. stocki* Clark
 Trunk with paired long spines on each segment, similar paired spines on lateral processes except posterior pair (males with row of spiniform processes lateral on each lateral process; proboscis short, barrel-shaped, with ventral swellings; palp 8-segmented *A. nimia* Stock
- 13) Lateral processes with tubercles only or tubercles and spines, of any size or number 14
 Lateral processes without tubercles, with only spines or setae of any size or number, or unadorned 25
- 14) Lateral processes with tubercles only 15
 Lateral processes with both tubercles and spines 18
- 15) Lateral processes with short slender tubercles 16
 Lateral processes with single, slender, dorsodistal, tubercle about length of segment diameter. *A. panamensis*, new species
- 16) Lateral processes crowded, trunk rotund; proboscis bulbous or typical 17
 Lateral processes well separated; proboscis typical; abdomen, chelifores, legs long, with long tubular spines and pointed spines, both longer than segment diameters. *A. alcalai* Child
- 17) Lateral processes with 2 anterior and 2 posterior spike-like tubercles; abdomen very long, with 2 or 3 sets of spines; legs and chelifores with many tubular spines, mostly ventral on legs, and few long pointed spines *A. marcusii* Hedgpeth
 Lateral processes with tiny, short, paired, dorsal tubercles; abdomen short, little longer than ocular tubercle; legs, chelifores, abdomen with few short tubular spines, none ventral, and few longer pointed spines *A. rotundata* Child
- 18) Lateral processes (males only) with single rows of sharp spikes laterally except 1st and 4th outer sides 19
 Lateral process spines paired, randomly placed, or lacking 20
- 19) Lateral processes with single dorsodistal pointed tubercle; ocular segment corners with similar tubercle; first scape segment without tubercle or spines *A. gibraltarensis* Munilla
 Lateral processes with 2–3 short dorsodistal tubercles, some bifurcate or trifurcate including those of ocular segment corners and first scape segment. *A. rostrata* Losina-Losinsky
- 20) Lateral processes with tubercles of any size and lateral spines or setae 21
 Lateral processes with only spines or setae, or both 25
 Lateral processes usually glabrous 34
- 21) Lateral process tubercles low single or bifurcate cones with 2 short spines 22
 Lateral process tubercles inconspicuous low cones, or bumps with or without spines, 23
 Lateral processes with 2–3 tall slender tubercles and paired lateral spines
 *A. setacea* (Helfer)
- 22) Lateral processes with bifurcate conical tubercles *A. tippula* Child
 Lateral processes with single pointed conical tubercles *A. symbia* Child
- 23) Tubercles small low points or slender. without short spines 24
 Tubercles low rounded bumps with 1 anterior and 1 posterior short spine of various sizes
 *A. vanninii* Stock
- 24) Each lateral process tubercle short, with 2–6 short lateral spines *A. longioculata* (Faraggiana)

- Each lateral process tubercle tall, without spines *A. longipes* (Hodge)
- 25) Lateral processes with thick spines only 26
 Lateral processes with both spines and setae 31
 Lateral processes with slender setae only 32
- 26) Trunk circular in dorsal view, lateral processes short, closely crowded, chelifores with many tubular spines 27
 Trunk oval in dorsal view, lateral processes longer, splayed, chelifores with many plain or few tubular spines 28
- 27) Lateral processes with few plain short lateral spines; legs with many tubular spines having setules *A. hedgpethi* Fage
 Lateral processes with 2–3 short lateral spines with setules; legs with few pointed spines only *A. heterosetosa* Hilton
- 28) Lateral processes with few short pointed or blunt simple spines; chelifores with few or many spines; legs with mostly tubular or mostly pointed spines 29
 Lateral processes with many short blunt spines with setules; chelifores with few pointed spines having setules; legs with simple pointed spines only *A. cymosa* Nakamura & Child
- 29) Chelifores with many pointed, few tubular spines; legs with mostly tubular ventral spines .. *A. dawsoni* Child & Hedgpeth
 Chelifores with many pointed and tubular spines; legs with various tubular and pointed spine arrangements 30
- 30) Chelifores with 2–3 pointed, few tubular spines; lateral processes with short laterodistal spikes; legs with 3–4 tubular and many feathered spines on legs. *A. schmitti* Child
 Chelifores with many pointed and tubular spines; lateral processes with 3 short tubular spines; legs with 2–7 tubular and few plain spines
 (new Australian species to be named and published)
- 31) Lateral processes with 1 tubular spine, 2–3 setae of the same length as spine
 *A. omanensis* Stock
 Lateral processes with 1–3 long slender setae and many very short lateral spines
 *A. pilosis* Losina-Losinsky
- 32) At least 1–2 plain setae on all lateral processes 33
 Anterior 2 lateral process pairs only with short posterior seta having setules (feathered)
 *A. pacifica* Hilton
- 33) Habitus compact, rotund; single long seta on posterior of each short lateral process
 *A. ovalis* Stock
- 33) Habitus very slender, attenuated; 1–2 moderately short setae on each long lateral process
 *A. tubicen* Stock
- 34) Habitus ovoid, not lengthened, lateral processes narrowly separated at their bases; ocular tubercle tall, eyes at tip; second scape segment more than twice longer than first; with tubular or plain spines 35
 Habitus elongate, lateral processes widely separated at bases; second scape segment only twice longer than first; legs with tubular and long plain spines *A. proluxa* Child
- 35) Ocular tubercle plain, without spines; proboscis of usual shape with major median swelling; appendages with plain and tubular spines in various arrangements 36
 Ocular tubercle with posterior spines or bumps; proboscis long, narrow, with basal constriction only; legs with very long and few short plain spines *A. elegantula* Stock
- 36) Lateral processes long, slender; first scape segment with short, tubular, dorsodistal spine, second segment 3–4 times longer than first; main leg segments very spiny with many tubular spines *A. indica* Stock
 Lateral processes shorter, rounded; first scape segment with no spines, second segment less than 3 times longer than first; leg segments lightly spinose, with very few tubular spines, fewer pointed spines *A. appendiculata* (Dohrn)

Genus *Tanystylum* Miers, 1879*Tanystylum birkelandi* Child, 1979

Tanystylum birkelandi Child, 1979: 23, fig. 7; 1982:363.—Müller, 1990b: 278–279, figs. 1–5.

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. 22-2000, June 29, 1977 (1 ♂).

Distribution.—This species is known from only a few Caribbean records in Panama, Belize, and Martinique Island, in littoral depths. It may be endemic to the Caribbean.

Remark.—Müller (1990) has a set of additional figures besides those given for the type specimen.

Tanystylum species indeterminate

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, 5 m, sta. MS-20-500, June 29, 1977 (1 juv., 2 larvae).

Remark.—These specimens are too immature for determination.

Family NYMPHONIDAE Wilson, 1878

Genus *Nymphon* Fabricius, 1794*Nymphon floridanum* Hedgpeth, 1948

Nymphon floridanum Hedgpeth, 1948: 196–199, fig. 17 [long-necked form only].—Stock, 1955:215 [long-necked form only], fig. 1a; 1975: 994–998, figs. 14–15.—Kraeuter, 1973:494.—Krapp and Kraeuter, 1976: 336–337.—Child, 1979: 37; 1982: 374.—Stock, 1986: 419.—Child, 1988b: 68 [key].

Material.—Belize, Belize City, channel off Manatee River south of Southern Lagoon, 17°13'12"N, 88°16'30"W, dredge in 25 m, sta. PD-69-500, July 17, 1977 (1 ♀).

Distribution.—Known from Florida, the Bahamas, the Caribbean to French Guiana and Guyana, and probably further south in a wide expanse of water depths from littoral to 402 m.

Remarks.—This is one of five known Caribbean species belonging to the *Nymphon aequidigitatum*-group (Child, 1988b: 67–68). This group contains 13 species with eight from the Indo-West Pacific, all of which share additional *Nymphon* characters besides the usual diagnostic characters of the genus. They (usually but not always) have bifurcate chelae teeth, a longer than usual terminal palp segment, and an oviger terminal claw usually without teeth. The auxiliary claws are longer than the main claw and only the main or all three claws may have tiny endal spinules or other rugosities. All species of the group share at least a multiple of these characters if not all of them. Another shared feature of this group is that most of them are found often in very shallow water either on reefs or reef slopes of less than 100 m depth. From what little is known concerning their habitats, it appears that some species are an integral if tiny part of the hordes of tropical reef fauna. This differs from most *Nymphon* habitats (where known), which are in deeper water and on substrates other than reefs.

This species can be recognized and separated from its Florida congener in this group, *N. aemulum* Stock, 1975, by its moderately long neck (shorter in *N. aemulum*), bifurcate chelae teeth (simple teeth in *N. aemulum*), and a movable chela finger shorter than its palm (both fingers as long or longer than palms in *N. aemulum*).

Family CALLIPALLENIDAE Hilton, 1942

Genus *Callipallene* Flynn, 1929

Callipallene brevirostris? (Johnston, 1837)

Pallene brevirostris Johnston, 1837:380, pl. 12, figs. 7, 8.

Callipallene brevirostris.—Hedgpeth, 1948: 202, 203 [early literature], fig. 18a; Child, 1992a: 60–61 [later lit.], fig. 27.

Material.—Netherlands West Indies, Island of Aruba, off Oranjestad, 12°30'18"N, 70°02'42"W, shallow, sta. MS-18-500, June 26, 1977 (1 juv.). Panama, Golfo de San Blas, Cayos Holandes, 09°34'36"N, 78°43'12"W, intertidal, sta. MS-23-500, June 30, 1977 (1 ♀ 1 juv.). Panama, Bahía Limón, 09°20'N, 79°55'W, plankton net, sta. BN-28-500, July 6, 1977 (1 ♀).

Distribution.—A very common amphi-Atlantic species found from Nova Scotia to Florida, Gulf of Mexico, Caribbean, northern Europe, and West Africa in shallow water.

Remarks.—This tiny species has a neck only as long as it is wide. It has the generic characters of lacking palps, having an oviger with denticulate spines but without terminal claw, and has long auxiliaries. The scapes are 1-segmented and the chelae are well developed with fingers having teeth. The long male fifth oviger segment has a laterodistal apophysis which presumably prevents the egg clusters from sliding off. The legs are quite slender and the propodus has several larger heel spines. The female and juvenile specimens in hand do not provide sufficient evidence to give them anything but a tentative identification based on the above characters.

Family PHOXICHILIDIIDAE Sars, 1891

Genus *Anoplodactylus* Wilson, 1878

Anoplodactylus ampullaceus new species

(Fig. 2)

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. 22-2000, June 29, 1977 (1 ♂ holotype, USNM 234733).

Other Material.—Colombia, Isla San Bernardo, in algae, sponges, hydroids on mangrove roots, 0–1 m, coll. B. Kensley, sta. K-COL-28, March 7, 1997 (2 ♂ with eggs, 1 ♂, 2 ♀, 1 juv.).

Distribution.—The new species is known from its holotype taken in San Blas Province, Panama, and from other specimens taken just across the Gulf of Darién on Isla San Bernardo, Colombia. Both collections were made in shallow water.

Description.—Size typical, leg span 19.6 mm. Trunk slightly broadened anteriorly and between segments, suture lines either incomplete or continuous between first-second, and second-third segments. Lateral processes only slightly longer than their maxi-

mum diameters, separated proximally by less than their diameters, armed with two or three short dorso- and laterodistal setae. Neck short, with ocular tubercle canted toward anterior, extending beyond anterior rim of neck at chelifore insertion, armed with single lateral setae. Ocular tubercle moderately long, darkly pigmented eyes placed distally just below apical cone of varying length. Proboscis moderately long, cylindrical, upcurved, with distal cleft between slightly bulging lips. Abdomen erect, slight distal tapering, with four or six short distal setae.

Chelifores moderately short, overreaching proboscis, scapes distally clubbed, armed with few short distal setae. Chelae typical, palm a cylinder with few distal setae, fingers shorter than palm, distally curved, movable finger thicker, armed with four short ectal setae. Fingers with endal irregular surface only, without teeth.

Ovigers with greatly inflated first segment, distal segments narrower. Third segment with proximal constriction, few lateral setae. Fourth with several distal setae, fifth and sixth segments combined longer than fourth, both with lateral setae, some longer than segment diameters. Sixth moderately long, about 0.6 length fifth segment.

Legs very lightly setose, with usual long dorsodistal spine on major segments. Second coxae with ventrodistal spur almost as long as segment diameter, armed with few setae. Femur and first tibia subequal in length. Femur with dorsodistal tubercle of varying length. Cement gland with single flask-shaped bulb and tube, narrowing distally, originating from circular subcuticular gland at slightly less than midsegment on femur dorsum. Tarsus very short, triangular, with ventral setae. Propodal heel at right angles to sole, armed with single strong spine and four distal setae. Sole armed with seven short distal-pointing spines each carried on tiny tubercle. Distal propodal lamina very short. Claw robust, as long as sole, without auxiliary claws.

Female characters: ocular tubercle with or without low apical cone. Fewer setae on lateral processes and first coxae. Second coxae without ventrodistal tubercle.

Measurements (in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 2.45; trunk width (across 1st lateral processes), 1.56; proboscis length, 1.25; abdomen length, 0.52; third leg, coxa 1, 0.47; coxa 2, 1.09; coxa 3, 0.49; femur, 1.5; tibia 1, 1.49; tibia 2, 1.32; tarsus, 0.22; propodus, 0.86; claw, 0.6.

Etymology.—The species name (Latin: *ampullaceus*, flasklike, from *ampulla*, a flask or bottle) refers to the long tapering flasklike cement gland and its tube on the distal femora.

Remarks.—These specimens were at first thought to be referable *A. trispinosa* Stock, 1951, but were found to be a new species on detailed examination. Some of the following differences between Panama specimens and Stock's types were discussed by Child (1979: 63). The gross morphology of both species is very closely related and the species distribution is even partly sympatric, at least in Panama.

In Stock's species, there are low lateral process tubercles, a very much shorter proboscis which is not curved or upturned, a much shorter abdomen, and cylindrical chelifore scapes. It also has a propodus with two major heel spines, a very long cutting lamina, only three sole spines before the lamina, and the claw has lateral auxiliary claws. Several other minor differences occur between the species, but these will serve to keep these sympatric species separate.

The new species has similarities to another Panamanian species, *A. reimerae* Child, 1979. This congener also has lateral process tubercles like those of *A. trispinosus*, has chelae fingers as long as the palm, but the ovigers and legs reveal the greatest differences.

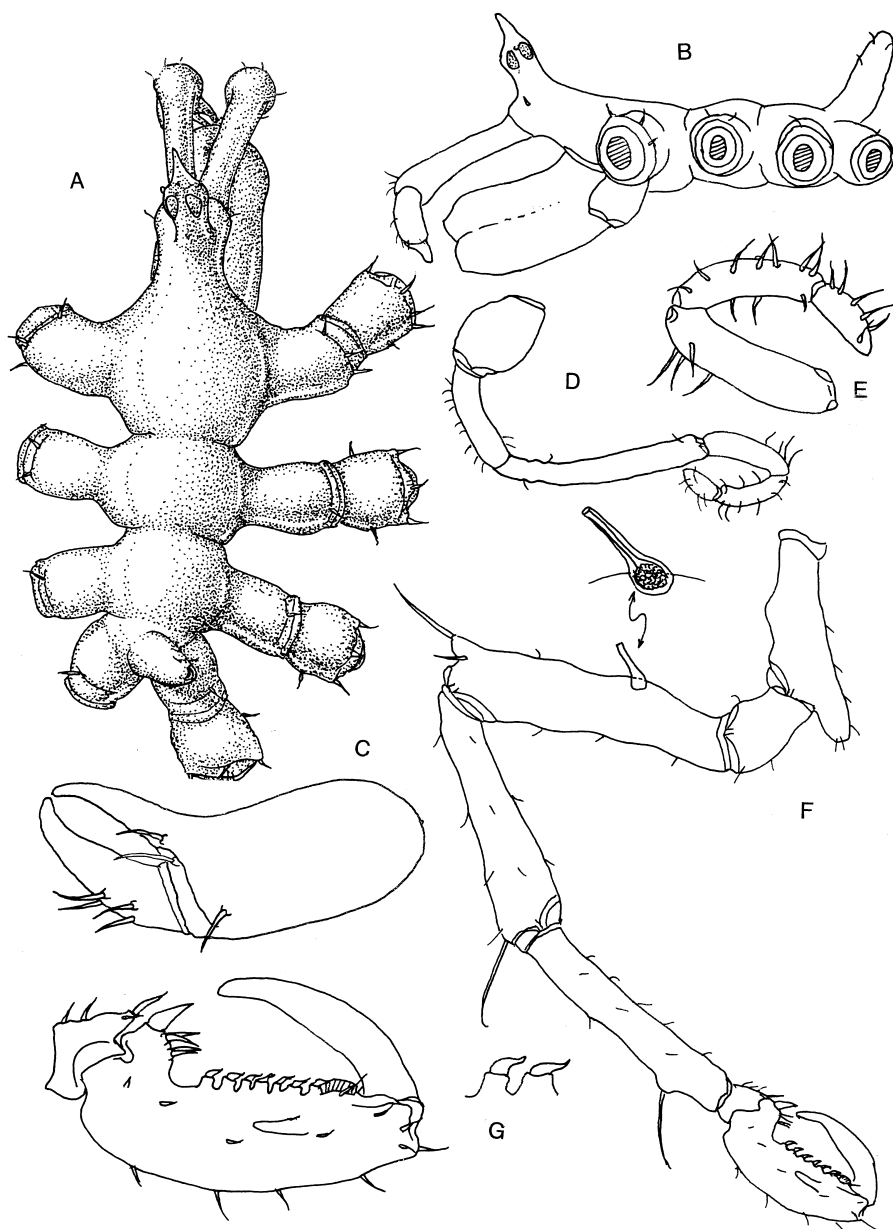


Figure 2. *Anoplodactylus ampullaceus*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, chela; D, ovipiger; E, ovipiger distal segments, enlarged; F, third leg, with enlargement of cement gland and tube; G, distal leg segments, enlarged, with two sole spines further enlarged.

The terminal segment of the ovipiger is little longer than wide in *A. reimerae* and has a row of few lateral recurved setae. The fifth and sixth segments are equal to, but not longer than the fourth ovipiger segment. The legs have second coxae with very long ventrodistal spurs which measure longer than the segment diameter. The size of the single cement gland is much broader and deeper and the opening is a short truncate cone rather than a slender tapered tube. The distal leg segments of *A. reimerae* are similar, but the heel has

two major spines, the sole has spines in sockets rather than on raised tubercles and the very robust claw has short thick auxiliary claws.

These three species appear to belong to a closely related group which possibly originate in the western Caribbean and are perhaps centered on Panama. The Caribbean has several other related groups in this vast genus.

Anoplodactylus arcuatus Child, 1977

Anoplodactylus sp. Hedgpeth, 1948: 236, fig. 35.

Anoplodactylus arcuatus Child, 1977: 584–587, fig. 1.—Müller, 1992b: 45–47, figs. 4–14.

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. MS-21-500, June 29, 1977 (1 ♂).

Distribution.—This is another species with few collecting records from the Caribbean (Barbados and Curaçao). It was found (but unnamed) in the Tortugas Islands of Florida and is now found on Panama's Caribbean coast. All records are from sublittoral to 18 m.

Remarks.—The distinctive male cement gland tube is sufficient for recognizing males of this slender graceful species. It always has an extreme distal placement on the femur unlike most other species in this large genus. Müller (1992b) gave a series of figures on the range of shapes and sizes of this curved tube. Females of this and almost all other species of *Anoplodactylus* are difficult or impossible to identify without accompanying males because they lack the distinctive diagnostic characters of the cement gland opening, genital spurs, and other characters not sexually related but which still differ from those of the female.

Anoplodactylus bahamensis Child, 1977

Anoplodactylus bahamensis Child, 1977: 587–589, fig. 2; 1982: 368.

Material.—Nicaragua, Punta Gorda, off Outer Mohegan Cay, 14°34'12"N, 82°58'00"W, shallow, sta. MS-39-500, July 11, 1977 (1 ♂ with eggs, 1 juv., 1 larva).

Distribution.—This is another seldomly collected species. It was described from the Bahamas and subsequently recorded from Belize. This is its first Nicaraguan record. All known depths are littoral and sublittoral.

Remarks.—This species has setose lateral process tubercles which are unusual among the approximately 140 known species in the genus. It has a broad raised cup-like cement gland opening also different from most species of this large genus. This combination of two unusual characters separates this otherwise commonplace-appearing species from all other known Caribbean members of the genus.

It has been suggested (J. H. Stock, pers. comm.) that this species is just *A. petiolatus* Kroyer in another of its many varied guises. A series of specimens of this proposed species would be necessary for comparison with the many specimens available of *A. petiolatus* to settle this question. Until a large series becomes available, this species should stand as described. The lateral process tubercles are not usually found on *A. petiolatus*.

Anoplodactylus batangensis (Helfer, 1938)

Pycnosoma batangense Helfer, 1938: 174–176, fig. 6a–c.

Anoplodactylus batangensis.—Stock, 1968:54 [early literature].—Zambrana, et al, 1985: 32.—Müller, 1990:106–109 [recent literature], fig. 47; 1992b:47.—Child, 1992: 41–42, fig. 18.—Stock, 1994: 54; Child, 1996: 549.

Material.—Honduras, off Punta Sal, 16°43'48"N, 87°52'00"W, shallow, sta. MS-54-500, July 15, 1977 (1 ♀).

Distribution.—Distribution is pantropical for this species which has been collected on both sides of the Panama Canal (Child, 1979) among many other localities in the Indo-Pacific and Atlantic.

Anoplodactylus californicus Hall

Anoplodactylus californicus Hall, 1912: 91–93, figs. 49, 52D, 52F, 52I, 52J; 1913:129–130, pl. 4, figs. 14–16,—Child, 1987: 554–555 [literature].—Müller, 1990: 284.—Child, 1992b: 37; 1995: 123–124.

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. 22-2000, June 29, 1977 (1 ♂, 1 ♀).

Distribution.—This is another shallow-water species with distribution in both pantropical and pantemperate localities. It has been described under several species names because Hall's types were inadequately described and poorly illustrated and then not seen for many years. They were lost until subsequently found and reexamined for identification by Child (1987: 554–555).

Anoplodactylus dissitus new species

(Fig. 3)

Material.—Honduras, E of Puerto Cortés, 16°04'30"N, 87°59'12"W, shallow, sta. MS-47-500, July 14, 1977 (1 ♂ holotype, USNM 234734).

Distribution.—Known only from its type locality, E of Puerto Cortés, Honduras, this specimen was collected at an unknown but shallow depth in the Caribbean.

Description.—Size tiny, leg span 6.35 mm. Trunk robust, only first-second segments fully segmented in dorsal view, second-third faintly and incompletely segmented. Lateral processes separated by slightly more than their diameters, little longer than twice their diameters, each armed with low, broad, dorsodistal tubercle of truncate cone shape. Neck short, ocular tubercle wide, twice as long as its diameter, eyes large, of equal size, pigment lacking. Proboscis moderately short, slightly inflated, oral surface almost flat. Abdomen short, about as tall as ocular tubercle, armed with pair of short laterodistal setae.

Chelifores slender, moderately short, overhang anterior of proboscis, armed with few distal setae. Chelae small, fingers cross at tips, without teeth. Ovigera slender, third segment very long, with proximal constriction, few lateral setae. Strigilis segments five and six equal in combined length to fourth, armed with few short lateral and endal setae. Terminal segment only about 0.3 as long as fifth.

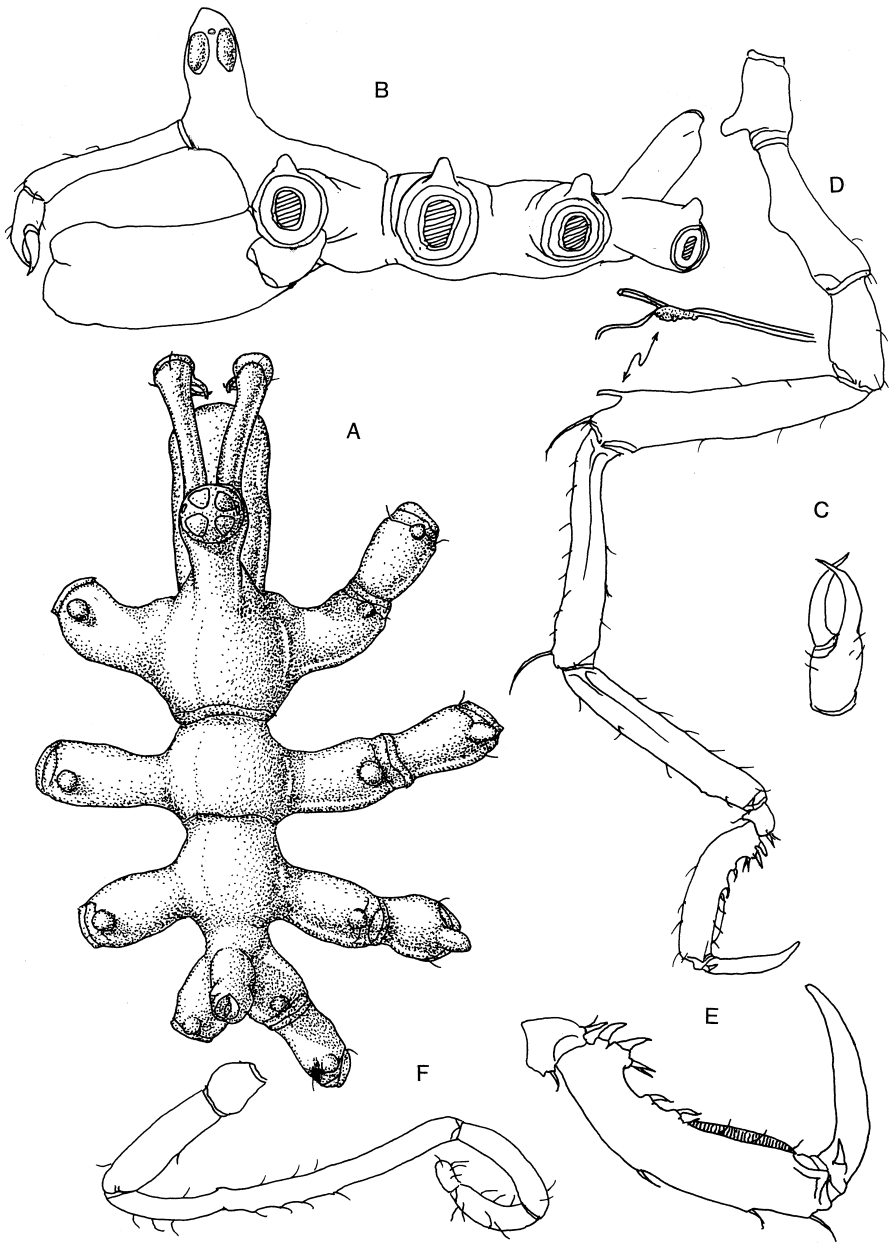


Figure 3. *Anoplodactylus dissitus*, new species, holotype: A, trunk, dorsal view; B, trunk, lateral view; C, chela; D, third leg, with enlargement of cement gland and tube; E, distal leg segments, enlarged; F, oviger.

Legs typical, with few short setae and the usual longer seta dorsodistally on each major segment. First coxae with low rounded dorsodistal tubercle corresponding to those on lateral processes but slightly larger. Femur the longest segment, with dorsodistal cement gland tube almost as long as segment proximal diameter. Tibiae equal in length. Tarsus

tiny, propodus moderately long, with proximal curve at heel which has two broad spines and two distal narrow spines. Sole armed with two short spines, four distal setae, and strong lamina extending for about half sole length. Claw moderately curved, about 0.6 length of propodus, tiny auxiliaries lateral to claw base.

Measurements (in mm).—Trunk length (chelifore insertion to tip 4th lateral processes), 0.87; trunk width (across 2nd lateral processes), 0.63; proboscis length, 0.45; abdomen length, 0.2; third leg, coxa 1, 0.19; coxa 2, 0.34; coxa 3, 0.23; femur, 0.56; tibia 1, 0.48; tibia 2, 0.48; tarsus, 0.07; propodus, 0.31; claw, 0.2.

Etymology.—The name (Latin: *dissitus*, meaning distant, apart, or remote) refers to the cement gland tube which is distant from its usual location in the middorsal region of the femur.

Remarks.—The cement gland tube is slightly curved and is placed dorsodistally in much the same locality as that of *Anoplodactylus arcuatus* Child, 1977 (see p. 154 herein), found in Florida and the Caribbean. The two species are otherwise quite different. The cement gland tubes of *A. arcuatus* are much longer and more curved than those of *A. dissitus*. This distal cement gland placement is a rare character among the many species of *Anoplodactylus*.

The new species also has conspicuous lateral process tubercles, the habitus is more compact and robust, and the leg segments are each shorter than those of *A. arcuatus*. There are a few similarities in several characters between the two species, which occur in the ocular tubercles, chelifores, ovigers, and tarsus-propodus-claw configurations.

This new species has many more similarities to *A. justii* Müller, 1992 (48–50, figs. 15–19). Most differences occur in the legs of *A. justii*, which are only similar in segment lengths to those of *A. dissitus*. The first coxae of *A. justii* lack the dorsodistal tubercles present in this species but they have small ventrodiscal tubercles on each second coxa which are lacking in the present species. The major leg segments of *A. justii* are more setose, the femora have a small dorsodistal tubercle, and the propodal soles have six spines and a short lamina (two spines and a longer lamina in *A. dissitus*). The most conspicuous difference between the two species is in the cement gland tube which, in *A. justii*, is longer, more erect, and placed more proximally than in *A. dissitus*. Müller's species was captured by dredge in Barbados while this new species comes from the opposite side of the Caribbean on the coast of Honduras in a 'shallow' depth. They perhaps belong to a series of similar species, including the three above, all inhabiting the Caribbean Sea.

This is another new species from well collected areas. It proves that collecting at differing depths or from different habitats can yield new fauna from sites thought to have been previously well searched for microfauna.

Anoplodactylus evelinae Marcus, 1940

Anoplodactylus evelinae Marcus, 1940: 55–58, pl. 4.—Child, 1982: 368–369 [literature].—Stock, 1992: 130.

Material.—Panama, San Blas Prov., Caledonia Harbor, off Isla de Oro, 08°54'42"N, 77°41'00"W, shallow, sta. 22-2000, June 29, 1977 (1 ♂ with eggs, 1 ♂, 2 ♀, 1 juv.). Panama, Golfo de San Blas, Punta de San Blas, 09°32'48"N, 78°59'40"W, dredge in shallows, sta. ND-26-500, June 30, 1977 (1 ♀).

Distribution.—This species has been collected in several shallow localities from Brazil to Florida and the Caribbean, and has been found on the Pacific coast of Panama.

Remarks.—This has some of the rarest characters of any *Anoplodactylus* species. Seen either dorsally or laterally, it has some features found in the genus *Pycnogonum*. The neck extends over the proximal proboscis but touches it instead of extending well above the proboscis as is typical. It has low dorsomedian trunk tubercles which is a very rare (almost unique) character in this genus. Two are on the first segment and a single one on the second. Its abdomen is inflated and extends horizontally from the trunk, a character very reminiscent of *Pycnogonum* species. And its leg segments are very short like those of most *Pycnogonum*. The second tibiae are only as long as wide. Its propodal heel is exaggerated in size and consists of a long truncate cone with a broad spine at its apex. The propodal claw is short and lacks auxiliaries. A subgenus has been proposed but not widely accepted for this species.

Anoplodactylus pectinus Hedgpeth, 1948

Anoplodactylus pectinus Hedgpeth, 1948: 234–236, fig. 34.—Child, 1982: 372–373 [literature]; 1988: 20.—Nakamura and Child, 1988: 662–663.—Stock, 1994: 64.—Child, 1996: 552.

Material.—Panama, Laguna de Chiriquí, off Cayo Agua, 09°12'48"N, 82°02'06"W, dredge in 1–2 m, sta. ND-30-500, July 8, 1977 (1 ♂ juv.).

Distribution.—This well known species was thought to inhabit only the Caribbean for many years until collected in Madagascar. It has since been collected in many Indo-West Pacific localities in shallow depths to 33 m. Its distribution is probably shallow pantemperate/pantropical.

Remarks.—This is one of the relatively few species in this huge genus to retain some of the green coloration often present at the time of capture. It keeps coloration at least in its legs when in alcohol. Other such 'colorfast' species are *A. lentus* Wilson, 1878, and *A. californicus* Hall, 1913, but Hall's species has many other characters differing from this species as does *A. lentus*.

The single pectinate major heel spine of this long slender form, which also has short lateral processes, serves to identify specimens of this species from the other more exaggeratedly slender species known to have pectinate heel spines. These pectinate species are *A. exageratus* Stock, 1994, and *A. tenuicarpus* Child, 1991. All three of these elongate species have very slender cheliformes, chelae smaller than usual, low rounded ocular tubercles, and relatively broad cement gland openings (two in *A. tenuicarpus*, one in each of the others). The short lateral processes of *A. pectinus* are in opposition to the longer and more slender processes of the other two, but the pectinate heel spine is apparently characteristic of all three slender species.

Anoplodactylus petiolatus (Krøyer, 1844)

Phoxichilidium petiolatum Krøyer, 1844: 123.

Anoplodactyllus petiolatus.—Hedgpeth, 1948: 222 [early literature].—Child, 1992a: 53–55 [later literature], fig. 24.

Material.—Panama, Laguna de Chiriquí, off Cayo Agua, 09°12'48"N, 82°02'06"W, dredge in 1–2 m, sta. ND-31-500, July 8, 1977 (2 ♀).

Distribution.—This is a common inhabitant of North Atlantic *Sargassum* weed and is thus transported great distances on these floating plants. It is reported from Norway to Argentina and into the Mediterranean and Black Seas. It lives mostly in the shallows when found separated from *Sargassum*.

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